

HOW COLD IS IT?

Suggested Grade

4

SD Mathematics Strand & Standard (*Primary for Task*)

Number Sense

4.N.1.4. Students are able to interpret negative integers in temperature.

Task Summary

Students read an outdoor thermometer and interpret negative integers in temperature for the week and determine the lowest temperature.

Time and Context of Task

1 week during lesson on integers

Materials Needed

Outdoor thermometer

Author and Lead Teacher for the Task

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Working with a partner, students will go outside and check the thermometer and record the temperature daily for one week in January or February. They will create a line graph displaying the week's temperatures. They will record the highest and the lowest temperature. They will check their work with the local weather station.

They will present their line graph data to the class addressing the questions:

- What information does the line graph provide?
- How did their record keeping compare with the local forecasts?



CONTENT STANDARDS

Primary Standard

Strand Name: Number Sense

SD Goal: Students will develop and use number sense to investigate the characteristics of numbers in a variety of forms and modes of operation.

Indicator: Analyze the structural characteristics of the real number system and its various subsystems. Analyze the concept of value, magnitude, and relative magnitude of real numbers.

Standard: 4.N.1.4. Students are able to interpret negative integers in temperature.

Supplemental Standard

Strand Name: Statistics and Probability

SD Goal: Students will apply statistical methods to analyze data and explore probability for making decisions and predictions

Indicator: Use statistical models to gather, analyze and display data to draw conclusions.

Standard: 4.S.1.1. Students are able to interpret data from graphical representations and draw conclusions

NCTM Process Standard

Representation

- Create and use representations to organize, record, and communicate mathematical ideas

Problem-Solving Strategies

- Drawing pictures, graphs, and tables
- Use of manipulatives

ASSESSMENT TOOLS

Task Rubric

Standard	Advanced	Proficient	Basic	Below Basic
4.N.1.4. Students are able to interpret negative integers in temperature.	<i>Students are able to accurately read an outdoor thermometer and determine the range and the high and low temperature of the week using negative integers.</i>	<i>Students are able to accurately read an outdoor thermometer and interpret negative integers in temperature for the week and determine the lowest temperature.</i>	<i>Students are able to accurately read an outdoor thermometer but have difficulty interpreting the negative integers.</i>	<i>Students are unable to read an outdoor thermometer.</i>
4.S.1.1. Students are able to interpret data from graphical representations and draw conclusions.	<i>Data represented correctly and appropriate scales drawn on a line graph. Accurate conclusions drawn interpreting the graph.</i>	<i>Some inaccuracies drawn on graph. Accurate interpretations drawn from graph.</i>	<i>Line graph incorrectly drawn. Can answer questions about line graphs.</i>	<i>Inability to recognize line graphs and the data they represent.</i>
Create and use representations to organize, record, and communicate mathematical ideas	<i>An in-depth explanation was given for your representation.</i>	<i>Mathematical representation helped clarify the information collected.</i>	<i>Mathematical representation was somewhat helpful in clarifying the information collected.</i>	<i>Mathematical representation did not clarify the information collected.</i>

**Fourth Grade Number Sense
Performance Descriptors**

Advanced	Fourth grade students performing at the advanced level: <ul style="list-style-type: none"> • solve problems using multiples and factors; • compare mixed numbers, proper and improper fractions; • solve problems using fractions and decimals.
Proficient	Fourth grade students performing at the proficient level: <ul style="list-style-type: none"> • add and subtract decimals with the same number of decimal places.
Basic	Fourth grade students performing at the basic level: <ul style="list-style-type: none"> • find multiples of numbers 2 - 10; • read, write, order, and compare numbers 1 through 1,000; • compare proper fractions on a number line; • add and subtract decimals with the same number of decimal places; • find the products of two-digit numbers multiplied by one-digit; • round two-digit numbers.

**Fourth Grade Number Sense
ELL Performance Descriptors**

Proficient	Fourth grade ELL students performing at the proficient level: <ul style="list-style-type: none"> • find multiples of numbers 2 - 12; • count by twos, threes and tens • compare fractions and mixed numbers using a number line; • interpret negative integers in temperature; • find the products of two-digit factors and the quotient of two natural numbers with a one-digit divisor; • use estimation in problem solving; • use the four basic operations to solve problems involving whole numbers; • add and subtract with same-place decimals; • read, write, order, and compare numbers from .01 to 1,000,000; • apply computational strategies in solving problems; • read, write, and speak the language of mathematics.
Intermediate	Fourth grade ELL students performing at the intermediate level: <ul style="list-style-type: none"> • use the four basic operations involving whole numbers to solve problems; • explain in mathematical terms the sequence of steps used in solving problems; • give simple oral or written responses to directed questions on topics presented in class.
Basic	Fourth grade ELL students performing at the basic level: <ul style="list-style-type: none"> • apply number operations (add, subtract, multiply) to solve problems involving whole numbers; • recognize and use basic mathematical terms; • respond to yes or no questions and to problems presented pictorially or numerically in class.
Emergent	Fourth grade ELL students performing at the emergent level: <ul style="list-style-type: none"> • solve numerical (not word) problems using addition and subtraction; • copy and write numerical symbols; • imitate pronunciation of numbers and mathematical terms; • use non-verbal communication to express mathematical ideas.
Pre-emergent	Fourth grade ELL students performing at the pre-emergent level: <ul style="list-style-type: none"> • observe and model appropriate cultural and learning behaviors from peers and adults; • listen to and observe comprehensible instruction and communicate understanding non-verbally.

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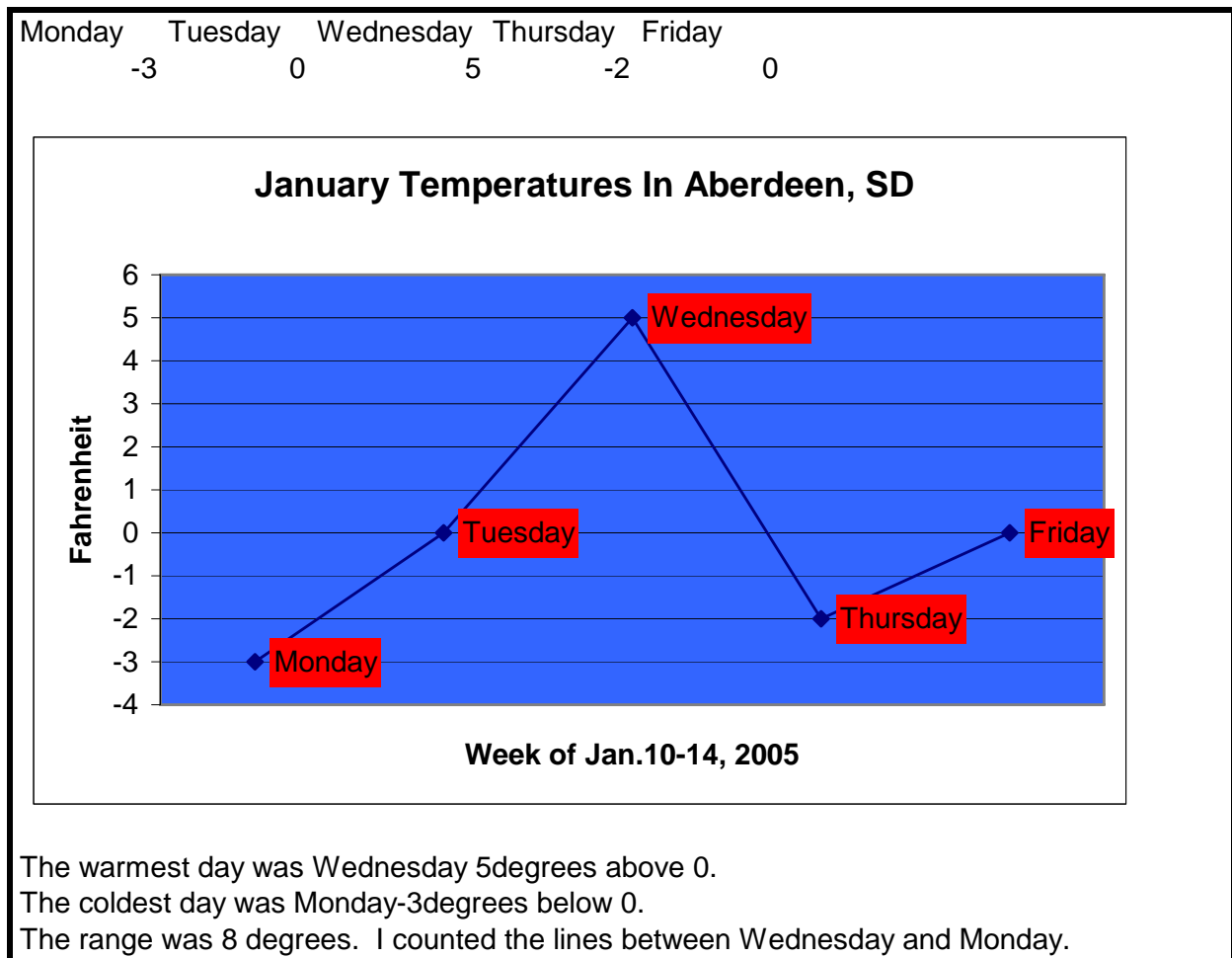
Student Work Samples



As you examine the samples, consider the following questions:

- In light of the standard/s addressed and the assessment tools provided, what evidence does the work provide that students are achieving proficiency in the knowledge and skills addressed by the standard/s for the task?
- Is the task/activity well designed to help students acquire knowledge and demonstrate proficiency? Is the task/activity clearly aligned with the standards? In what ways would you adapt the task/activity to better meet the needs of your students?

Student Work Sample #1

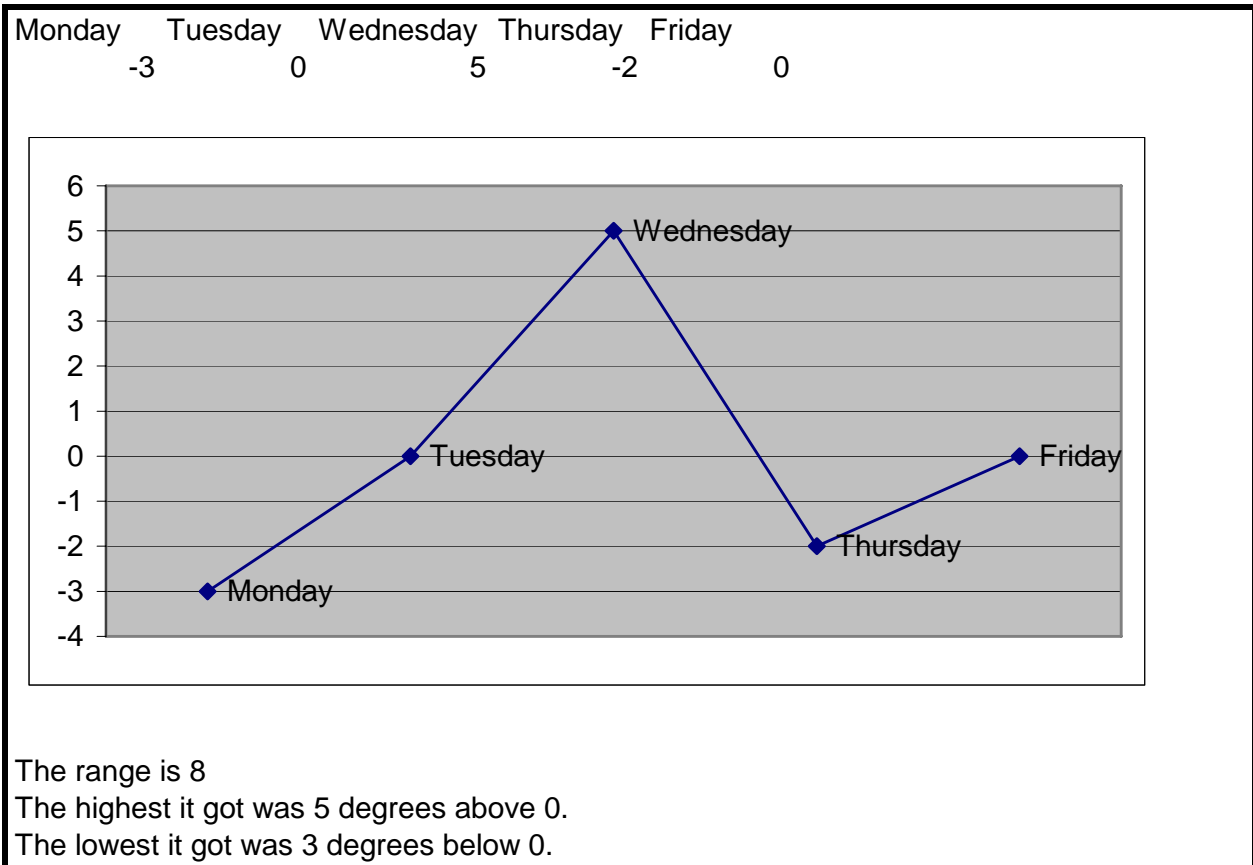


Looking at Student Work – Instructor notes and rating for work sample #1:

Based on the task rubric and the Content Standard Performance Descriptors, the lead teacher rated this student's work ADVANCED.

What evidence do you see in the student work that demonstrates that this student has an ADVANCED skill level?

Student Work Sample #2

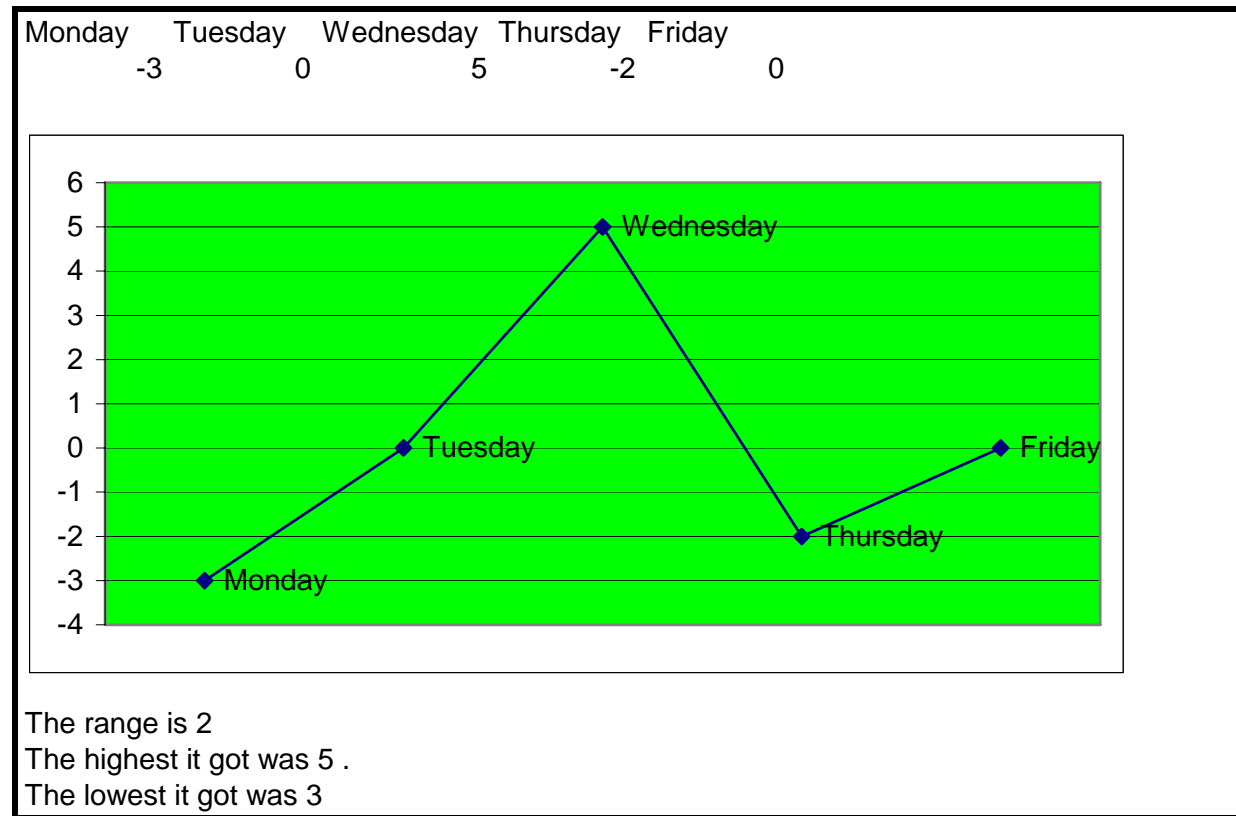


Looking at Student Work – Instructor notes and rating for work sample #2:

Based on the task rubric and the Content Standard Performance Descriptors, the lead teacher rated this student's work PROFICIENT.

What evidence do you see in the student work that demonstrates that this student has a PROFICIENT skill level?

Student Work Sample #3



Looking at Student Work – Instructor notes and rating for work sample #3:

Based on the task rubric and the Content Standard Performance Descriptors, the lead teacher rated this student's work BASIC.

What evidence do you see in the student work that demonstrates that this student has a BASIC skill level?

INSTRUCTIONAL NOTES

Web Resources for this Lesson

- Positive/Negative Integer Temperature Test for Students
<http://www.teachingandlearningresources.co.uk/temperature.shtml>
- Challenge Exercises For Students
http://www.mathgoodies.com/lessons/vol5/challenge_vol5.html
- Record Temperatures And Other Weather Data
<http://www.usatoday.com/weather/wcstates.htm>

Interdisciplinary Connections

Science-weather, Geography-research for the lowest temperature recorded in the United States

Literature Connections

- Little Cliff and the Cold Place by Clifton Taulbert
 - Elmer in the Snow by David McGee
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Resources

SD Mathematics Content Standards

<http://www.doe.sd.gov/contentstandards/math/index.asp>

SD Assessment and Testing

<http://www.doe.sd.gov/octa/assessment/index.asp>

The National Assessment of Educational Progress (NAEP)

<http://www.doe.sd.gov/octa/assessment/naep/index.asp>

National Council of Teachers of Mathematics

<http://nctm.org/>

Looking at Student Work

<http://www.lasw.org/index.html>